

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Bioluminescence of the dinoflagellate *Pyrocystis lunula* stimulated by shaking

File Name: Supplementary Movie 2

Description: Side view of the bioluminescence of the dinoflagellate *Pyrocystis lunula* stimulated by the vibration of a cantilever.

File Name: Supplementary Movie 3

Description: Top view of the bioluminescence of the dinoflagellate *Pyrocystis lunula* stimulated by the vibration of colored cantilevers.

File Name: Supplementary Movie 4

Description: Bioluminescence of the dinoflagellate *Pyrocystis lunula* within a device stimulated by contact by objects of different geometries.

File Name: Supplementary Movie 5

Description: Active actuation-induced and passive disturbance-induced bioluminescence of the soft actuator/robot for illumination.

File Name: Supplementary Movie 6

Description: Actuation-induced bioluminescence of the uni-directional and bidirectional soft bending actuators for optical signaling.

File Name: Supplementary Movie 7

Description: Actuations of the four-legged soft robot in different sequences to display programmable patterns for optical signaling.

File Name: Supplementary Movie 8

Description: Bioluminescence of the dinoflagellate *Pyrocystis lunula* due to magnetic actuation of an untethered biohybrid soft robot.

File Name: Supplementary Movie 9

Description: Maintenance of bioluminescence of the magnetically controlled biohybrid soft robot.